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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte DAVID JAMES BEALE and
MATTHEW JAMES ASTILL HOLMES

Appeal 2007-3680
Application 10/649,164
Technology Center 1700

Decided: January 9, 2008

Before BRADLEY R. GARRIS, CATHERINE Q. TIMM, and
LINDA M. GAUDETTE, *Administrative Patent Judges*.

GAUDETTE, *Administrative Patent Judge*.

DECISION ON APPEAL

1 This is an appeal from the final rejection of claims 1, 3-5, 8-11, 13-17, 19, 20, 27-30, 35, 37, 39-45, and 66-69. Claims 21-26, 31-34, 36, and 38 are also pending in the application and have been indicated as allowable. Claims 62-65 are pending and are allowed. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

The invention relates to machines and methods for metal ingot casting. (Spec. 1, ll. 5-6). Continuous casting machines are typically constructed using a circular arrangement to allow continuous filling, removal, and refilling of ingot forming moulds. (Spec. 1, ll. 21-22). A conventional casting machine includes a casting ring for supporting a plurality of moulds, the casting ring, in turn, being supported from a central axle having radial arms. (Spec. 1, ll. 23-25). A number of drawbacks are associated with this prior art configuration, principally because the space inside the casting ring is rendered unusable by the radial supporting arms which rotate through the inside of the casting ring. (*See* Spec. 2, ll. 6-16). Examples of these drawbacks are that: (1) the ring cannot be placed in a location where building columns would be positioned inside the ring, because such columns would interfere with the rotation of the arms, (2) the components of the ring are not accessible from inside the ring for maintenance and operational purposes, which reduces the flexibility of the machine, and (3) system components, such as water piping for the ingot cooling means, cannot be positioned inside the ring. (Spec. 2, ll. 16-23).

According to Appellants, they have discovered that the above-noted drawbacks are overcome by using a casting ring which is fully supported from below, and in which the space inside the ring is clear and may be used for purposes other than simply supporting the casting ring. (Spec. 3, ll. 16-19). Claims 1, 11, and 17 are illustrative of the invention and are reproduced below:

1. An aluminum ingot casting machine comprising:
a source of molten metal;

a rotatable annular ring, said ring defining a space inside said ring, said annular ring having a generally vertical axis of rotation and being sized and shaped to carry a plurality of ingot casting molds, the annular ring comprising a mold-carrying carousel and a support structure supporting the carousel, the support structure comprising an inner and an outer circular rail; and;

a drive means, located substantially outside said space, for indexing said molds to said source of molten metal by rotating said annular ring, the drive means comprising a drive gear means fixed to one of said circular rails, and a drive sprocket for driving said drive gear means.

11. An aluminum ingot casting machine comprising:

a source of molten metal, the source of molten metal comprising at least two pivoting crucibles to permit continuous pouring of molten aluminum;

a rotatable annular ring, said ring defining a space inside said ring, said annular ring having a generally vertical axis of rotation and being sized and shaped to carry a plurality of ingot casting molds;

drive means, located substantially outside said space, for indexing said molds to said source of molten metal by rotating said annular ring; and

a Y-shaped launder, the launder having first and second receiving portions for receiving molten metal, the first receiving portion being positioned to receive molten metal from one of said crucibles and the second receiving portion being positioned to receive molten metal from another of said crucibles, the launder further comprising a molten metal delivery portion extending between the receiving portions and the carousel.

17. An aluminum ingot casting machine as claimed in claim 1 further including a water sprayer cooling system located below said annular ring, the cooling system includes a plurality of nozzle for spraying water onto said moulds.

The Examiner relies on the following prior art references to show unpatentability:

Worswick	US 3,200,451	Aug. 17, 1965
Kikkawa	US 3,972,368	Aug. 3, 1976
Hunter	US 4,589,467	May 20, 1986

The Examiner made the following rejections:

1. Claims 1, 3-5, 8-10, and 66-69 under 35 U.S.C. § 103 as unpatentable over Hunter.
2. Claims 11, 13-16, 28-30, 35, 37, and 39-45 under 35 U.S.C. § 103 as unpatentable over Hunter in view of Kikkawa.
3. Claims 17, 19, 20, and 27 under 35 U.S.C. § 103 as unpatentable over Hunter in view of Worswick.

Appellants' arguments with respect to each ground of rejection are limited to independent claims 1 and 66, independent claim 11, and dependent claim 17, respectively.

Rejection of claims 1, 3-5, 8-10, and 66-69 under 35 U.S.C. § 103 as unpatentable over Hunter

Appellants contend that the Examiner failed to establish a prima facie showing of obviousness because Hunter “fails to teach or suggest an annular ring defining a space inside of the ring as required by independent claims 1 and 66.” (Br. 12 (emphasis omitted)). The Examiner contends that this feature is clearly shown in Figure 13 of Hunter. (Ans. 6).

Appellants' contention is based on their belief that the Examiner applied an overly broad interpretation of the claims. (Reply Br. 3). More specifically, Appellants maintain that the claim phrase "said [annular] ring defining a space inside said ring," when interpreted in light of the Specification, requires a "hollow portion within the annular ring." (Reply Br. 2). Stated differently, Appellants assert that the space inside the ring must be "void of such operational components." (Br. 12). Therefore, Appellants argue that the claims patentably distinguish over Hunter which discloses the use of various operational components inside the ring. (Br. 12).

Before considering the merits of the Examiner's rejection, we must first determine whether the claims, as drafted, preclude the presence of operational components in the space defined by the annular ring. The following portions of the Specification provide guidance as to the scope and meaning of the claim language "a rotatable annular ring, said ring defining a space inside said ring":

- 1) According to the Specification, "[p]rior art mould carousels have typically been driven from at or near the centre of the carousel ring, with the rings including drive arms extending inward to the drive means. By contrast, in the present invention, the ring is 'annular', i.e. substantially hollow, meaning, inter alia, that no central drive arms rotate through the space inside the ring." (Spec. 16, ll. 17-23).

- 2) The Specification states that the annular ring is preferably in the form of a wheel 32. (Spec. 16, ll. 17-18). A “motor, gear box and controller drive a drive sprocket 100, which drives the wheel 32 by engaging drive gear means, preferably in the form of a series of cam followers 102 fixed to and distributed around the wheel 32.” (Spec. 15, ll. 29-32). “The drive means 47 preferably is fixed to the floor adjacent to the wheel 32” (Spec. 15, ll. 26-27) and “acts between the floor and the wheel 32” (Spec. 16, l. 1).
- 3) The Specification discloses that “the use of an annular ring allows the space inside the ring to be used in a number of ways. For example, the drive means 47, and the wheel 32, are easily accessible from inside the ring; access is not impeded by moving drive arms. This allows access from inside the ring to various parts of the machine 10 for both operational and maintenance purposes. Water connection piping can be positioned inside the ring. Also, because the wheel 32 is annular, the machine 10 can be placed in a building having columns located inside the wheel 32. Because the wheel 32 is an annular ring, the building columns do not interfere with the motion of the wheel 32. Thus, the use of an annular ring provides greater flexibility in locating the wheel 32.” (Spec. 16, l. 24- p. 17, l. 2).

During prosecution, claims are given their broadest reasonable interpretation consistent with the Specification, keeping in mind that broad claim terms should not be limited solely on the basis of Specification passages. *In re Bigio*, 381 F.3d 1320, 1324 (Fed. Cir. 2004). We find that one of ordinary skill in the art would understand the language “a rotatable annular ring, said ring defining a space inside said ring” as requiring an

annular ring having a hollow portion, or opening, which is not impeded by moving drive arms during a casting process. However, we do not find any basis in the Specification or claims for Appellants' proposed narrow construction of this language, i.e., a ring defining a space which is void of all operational elements. To the contrary, Appellants' Specification states that water connection piping can be positioned inside the ring. (*See* Specification, item (3) above). Appellants have not explained why water connection piping would not constitute an "operational element."

Turning now to the merits of the Examiner's rejection, the Examiner found that Appellants' Figure 1 and Hunter's Figure 13 show substantially the same relative positioning of drive means with respect to the inside of an annular ring. (Ans. 6). The Examiner contends that because Appellants' Figure 1 structure meets the claim limitation of an annular ring defining a space inside said ring, then Hunter's structure must also meet this limitation. (Ans. 6). Appellants do not dispute the Examiner's finding of correspondence between the ring/drive means arrangements of Appellants' Figure 1 and Hunter's Figure 13. Rather, Appellants argue that "Hunter also teaches a pneumatic cylinder (100) mounted across the space in the middle of the ring, as well as, additional structure within the interior of the ring which would prevent one from achieving the advantages of a hollow ring structure discussed in detail throughout the specification." (Reply Br. 3). Appellants thus contend that Hunter "teaches away from the present invention." (Br. 12). Based on the contentions of the Examiner and Appellants, the issue before us is: Have Appellants demonstrated that Hunter's positioning of components within the annular ring teaches away from the claimed invention? We answer this question in the negative.

Based on our interpretation of the claims, we are in agreement with the Examiner that Hunter discloses "a rotatable annular ring, said ring defining a space inside said ring," i.e., an annular ring having a hollow portion, or opening, which is not impeded by moving drive arms during a casting process. Appellants use the transitional term "comprising" in claims 1 and 66, which opens the claims to include additional structural elements. *See, e.g., Exxon Chem. Pats., Inc. v. Lubrizol Corp.*, 64 F.3d 1553, 1555 (Fed. Cir. 1995); *In re Baxter*, 656 F.2d 679, 686-87 (CCPA 1981). In other

words, the casting machine, as claimed, does not preclude the presence of additional components, such as a pneumatic cylinder, which are in, or extend through, the ring opening.

"A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant." *In re Gurley*, 27 F.3d 551, 553, (Fed. Cir.1994). Because claims 1 and 66 do not preclude the presence of operational components, other than moving drive arms, in the space defined by the ring, Hunter cannot be said to teach away.

Accordingly, we find that the Examiner established a prima facie showing of obviousness as to claims 1, 3-5, 8-10, and 66-69 which Appellants have failed to refute.

*Rejection of claims 11, 13-16, 28-30, 35, 37, and 39-45 under 35
U.S.C. § 103 as unpatentable over Hunter in view of Kikkawa*

Appellants contend that the Examiner failed to establish a prima facie showing of obviousness because the combined teachings of the references fail to disclose or suggest “a Y-shaped launder with first and second receiving portions for receiving molten metal.” (Br. 13). Appellants maintain that Kikkawa “teaches the exact opposite of the invention of claim 11” (Br. 13) and “has no appreciation for the advantages that can be achieved by the design of the features of claim 11” (Reply Br. 3).

The Examiner agrees that Kikkawa differs from the claimed invention in that “Kikkawa discloses a Y-shape dispensing unit, feeding to two other molds, wherein appellant’s invention is using the Y-shape from the two molds to dispense into one.” (Ans. 7). However, the Examiner contends that “[w]hether it dispenses from one source to two, or from two sources to one, would have been obvious to an [sic] ordinary skill in the art, since only the Y-shape would allow an interconnection between three molds.” (Ans. 8). The issue presented is: Has the Examiner provided a reasonable basis to conclude that the proposed modification of Hunter to include a Y-shaped launder as claimed is merely a predictable use of Kikkawa’s dispensing unit? We answer this question in the affirmative.

“When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product . . . of ordinary skill and common sense.” *See KSR Int’l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1742 (2007). In our view, the facts and

reasons set forth in the Examiner's Answer establish a prima facie showing of obviousness. Appellants' arguments are not persuasive in overcoming this prima facie showing because they fail to address the Examiner's findings with respect to the knowledge and skills of the ordinary artisan. In other words, Appellants argue that *Kikkawa* has no appreciation for the advantages achieved by the invention, but have not explained why one of ordinary skill in the art would not have concluded that Kikkawa's Y-shaped dispensing unit could be used in either of two possible configurations for interconnecting three molds (i.e., to dispense from one source to two, or from two sources to one).

Accordingly, we find that a preponderance of the evidence favors the Examiner's conclusion of obviousness as to claims 11, 13-16, 28-30, 35, 37, and 39-45.

Rejection of claims 17, 19, 20, and 27 under 35 U.S.C. § 103 as unpatentable over Hunter in view of Worswick

Appellants contend that the Examiner failed to establish a prima facie showing of obviousness as to claims 17, 19, 20, and 27 because the combined teachings of the references fail to disclose or suggest "a plurality of nozzles for spraying water onto said molds" as claimed. Appellants do not dispute the Examiner's proposed motivation for combining the teachings of Hunter and Worswick. Rather, Appellants argue that Worswick discloses a single water nozzle. (Reply Br. 4). According to Appellants, this single nozzle sprays each individual mold as it passes by the nozzle while being advanced along a conveyor. (Reply Br. 4). The Examiner contends that because Worswick discloses spraying "the undersides of the molds with

water,” Worswick implicitly discloses a plurality of nozzles. (Ans. 8 (citing Worswick, col. 1, ll. 10-13)).

The issue thus presented is: Has the Examiner provided sufficient facts and reasons to establish that it would have been obvious to have modified Hunter’s machine to include a plurality of spray nozzles based on Worswick’s disclosure? We answer this question in the affirmative.

To establish obviousness, the Examiner is not required to identify precise teachings in the prior art, but may properly “take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *KSR*, 127 S. Ct. at 1741. In our view, the Examiner reasonably concluded that one of ordinary skill in the art at the time of the invention would have understood from Worswick’s disclosure that one or more nozzles could be utilized for cooling the molds. Appellants have not explained why the use of more than one nozzle would not have been within the level of skill of the ordinary artisan. Nor have Appellants presented evidence of unexpected results achieved by the claimed plurality of nozzles.

Accordingly, we will sustain the Examiner’s decision rejecting claims 17, 19, 20, and 27.

ORDER

The decision of the Examiner rejecting claims 1, 3-5, 8-10, and 66-69 under 35 U.S.C. § 103 as unpatentable over Hunter; claims 11, 13-16, 28-30, 35, 37, and 39-45 under 35 U.S.C. § 103 as unpatentable over Hunter in view of Kikkawa; and claims 17, 19, 20, and 27 under 35 U.S.C. § 103 as unpatentable over Hunter in view of Worswick is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(i)(iv).

AFFIRMED

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